

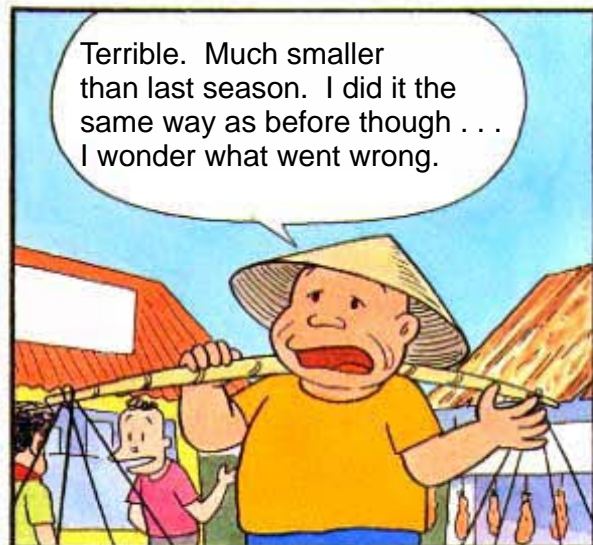
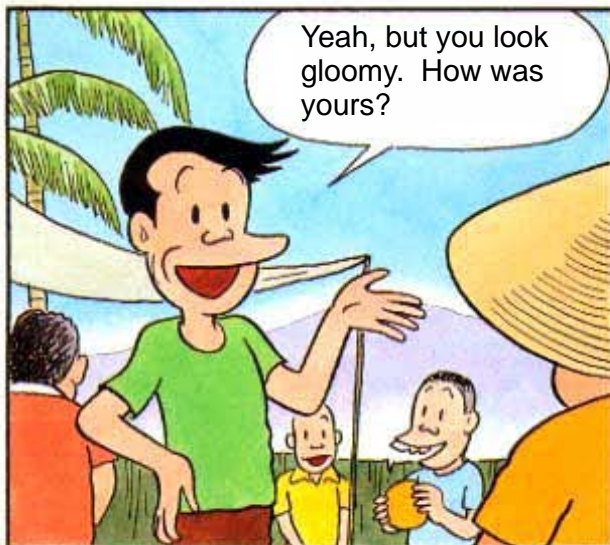


# Get a Better Rice Harvest

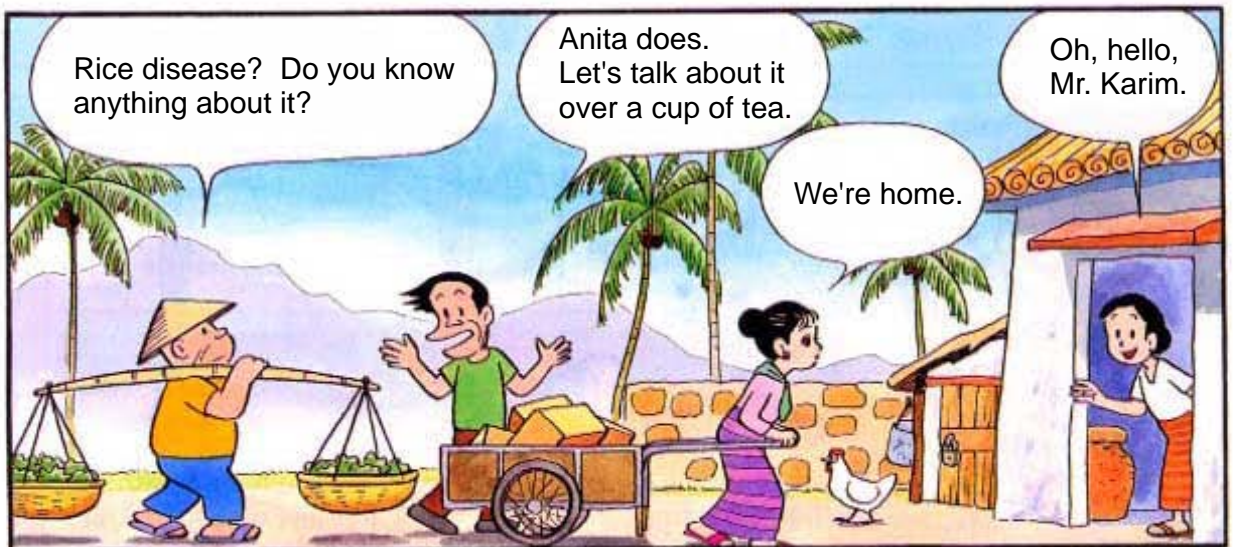
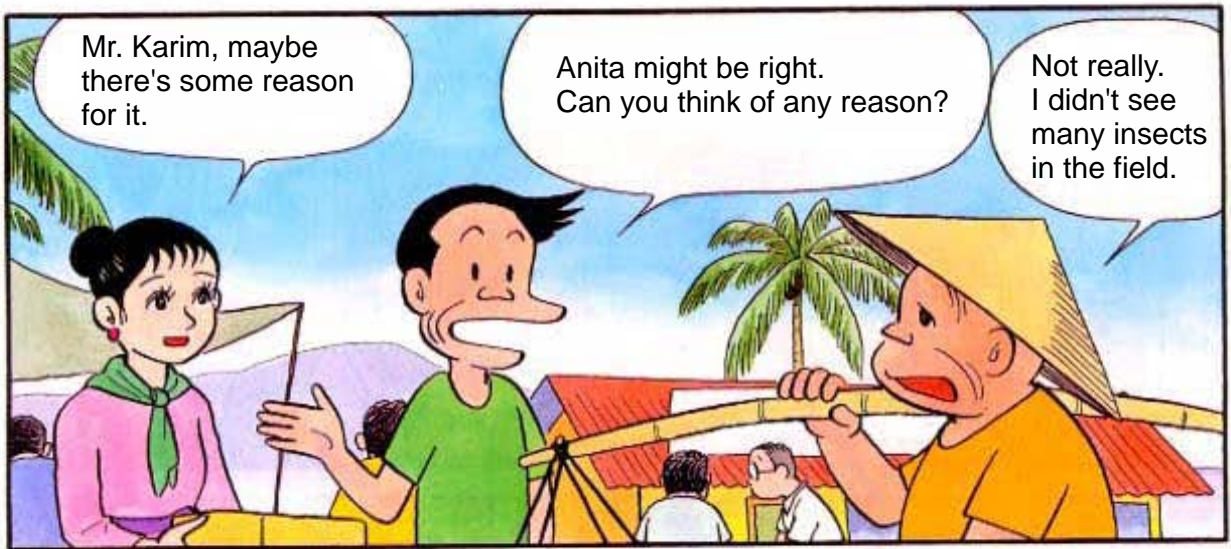
Simple Ways to Prevent Diseases

Asia/Pacific Cultural Centre for UNESCO (ACCU)

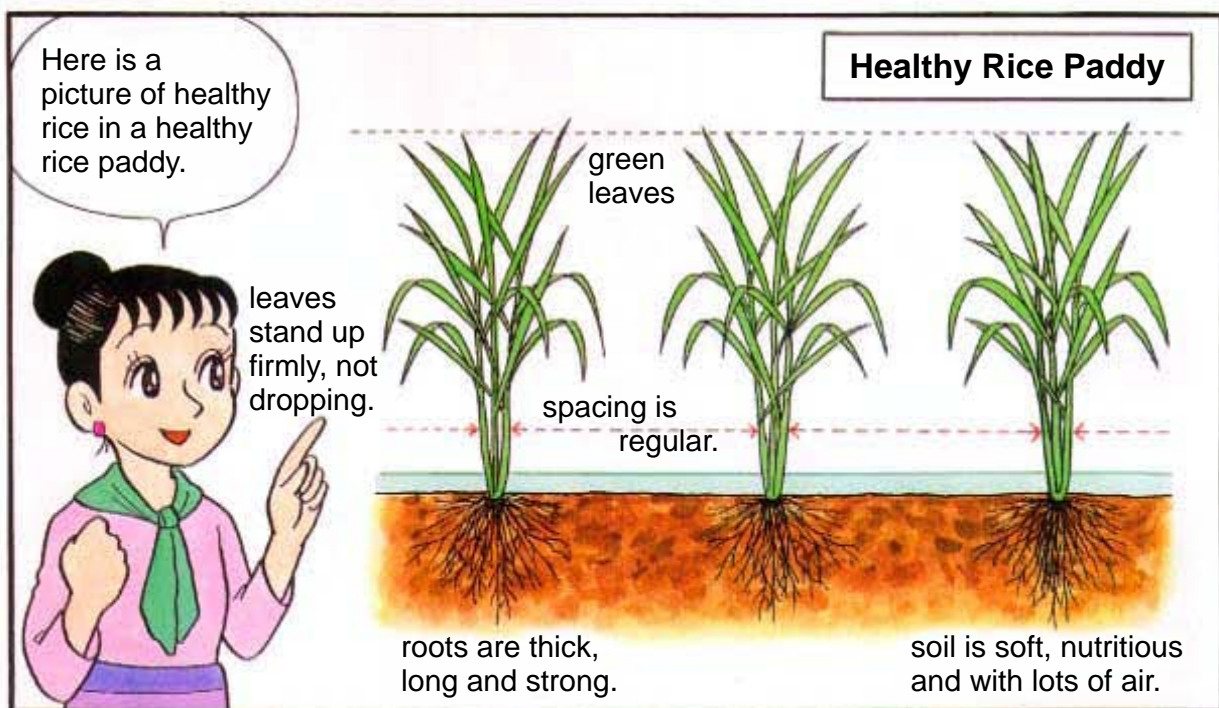
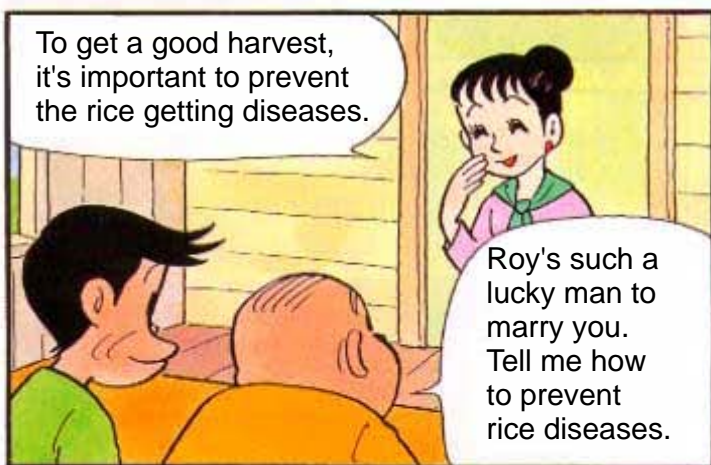


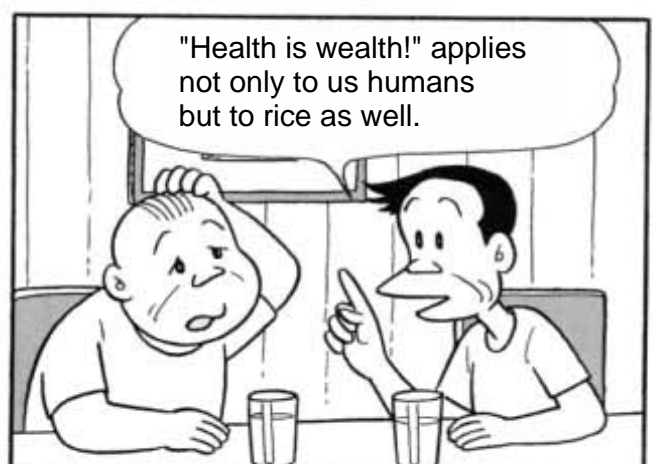
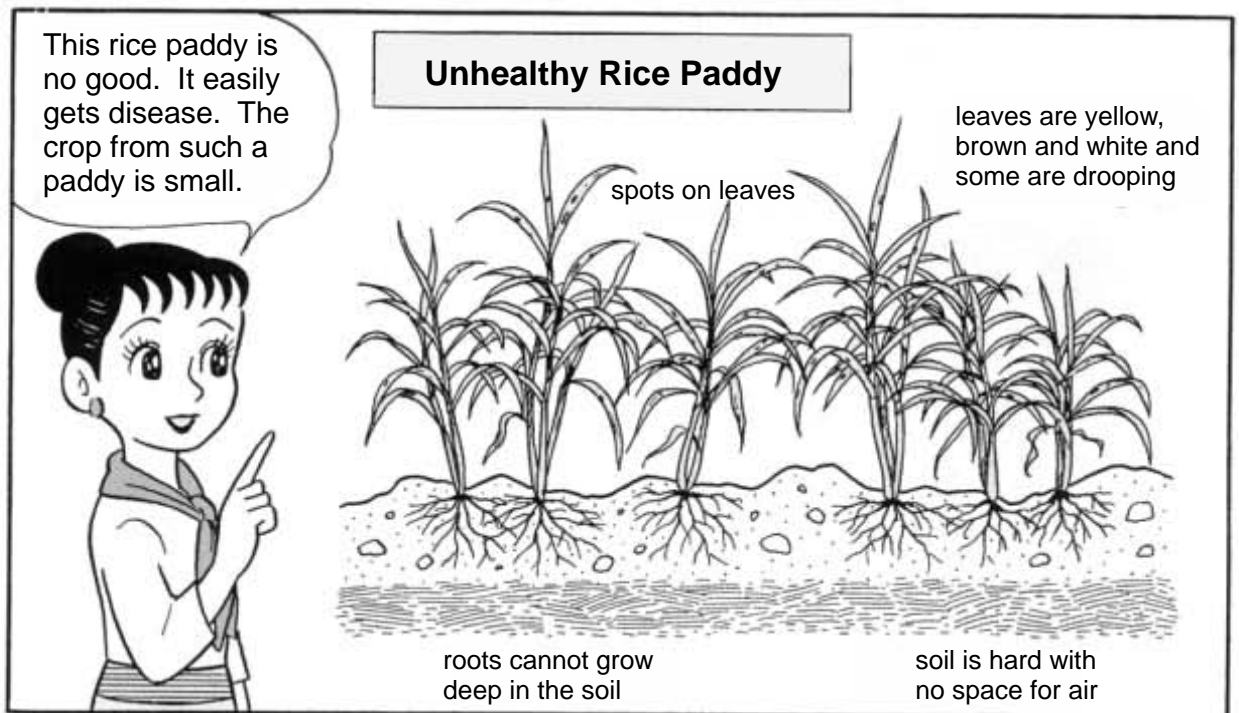
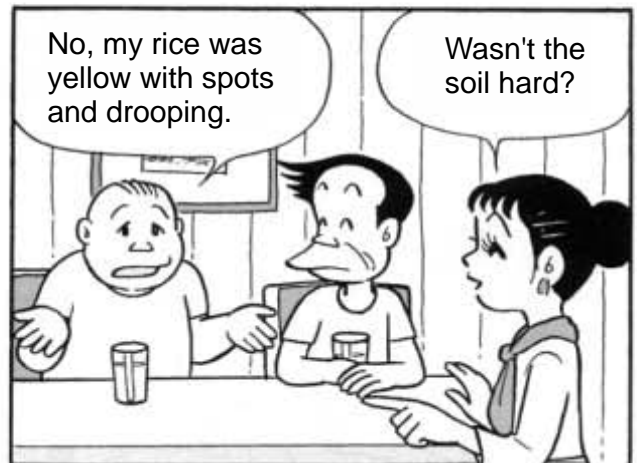












## Healthy Soil for Strong Rice

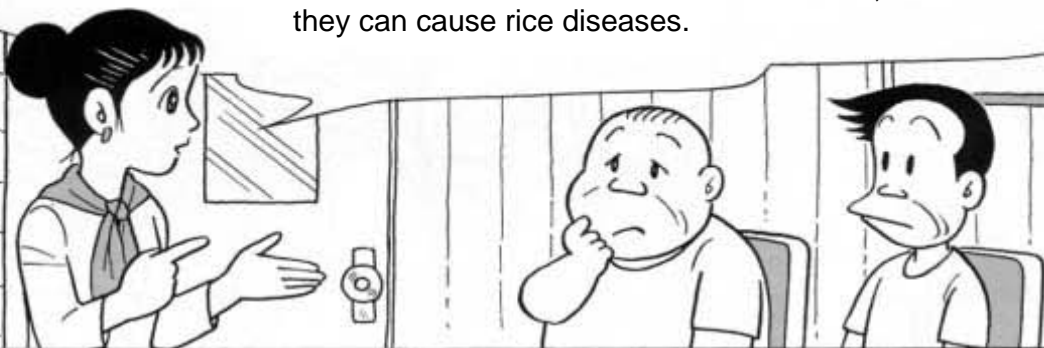
The best way to prevent disease is to grow strong rice which can resist.



But how can we grow such strong rice?

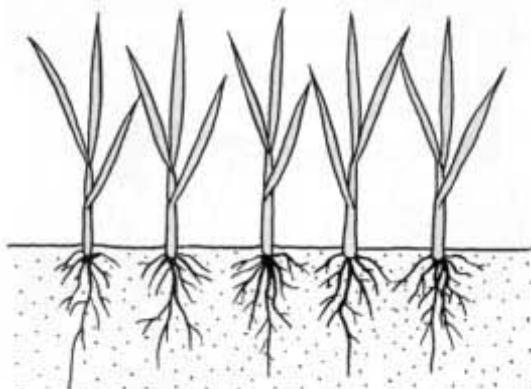


To grow strong rice, the soil must be healthy.  
Healthy soil helps the roots to grow big and deep.  
But if diseased stubble and straw are left in the soil,  
they can cause rice diseases.



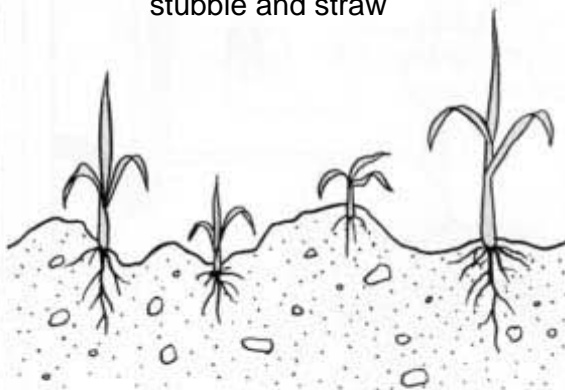
### Healthy Soil

- \* soft soil - easy to plough
- \* no weed seeds
- \* earthworms are active



### Unhealthy Soil

- \* hard soil - lack of air or water
- \* weed seeds
- \* crop residues with disease stubble and straw

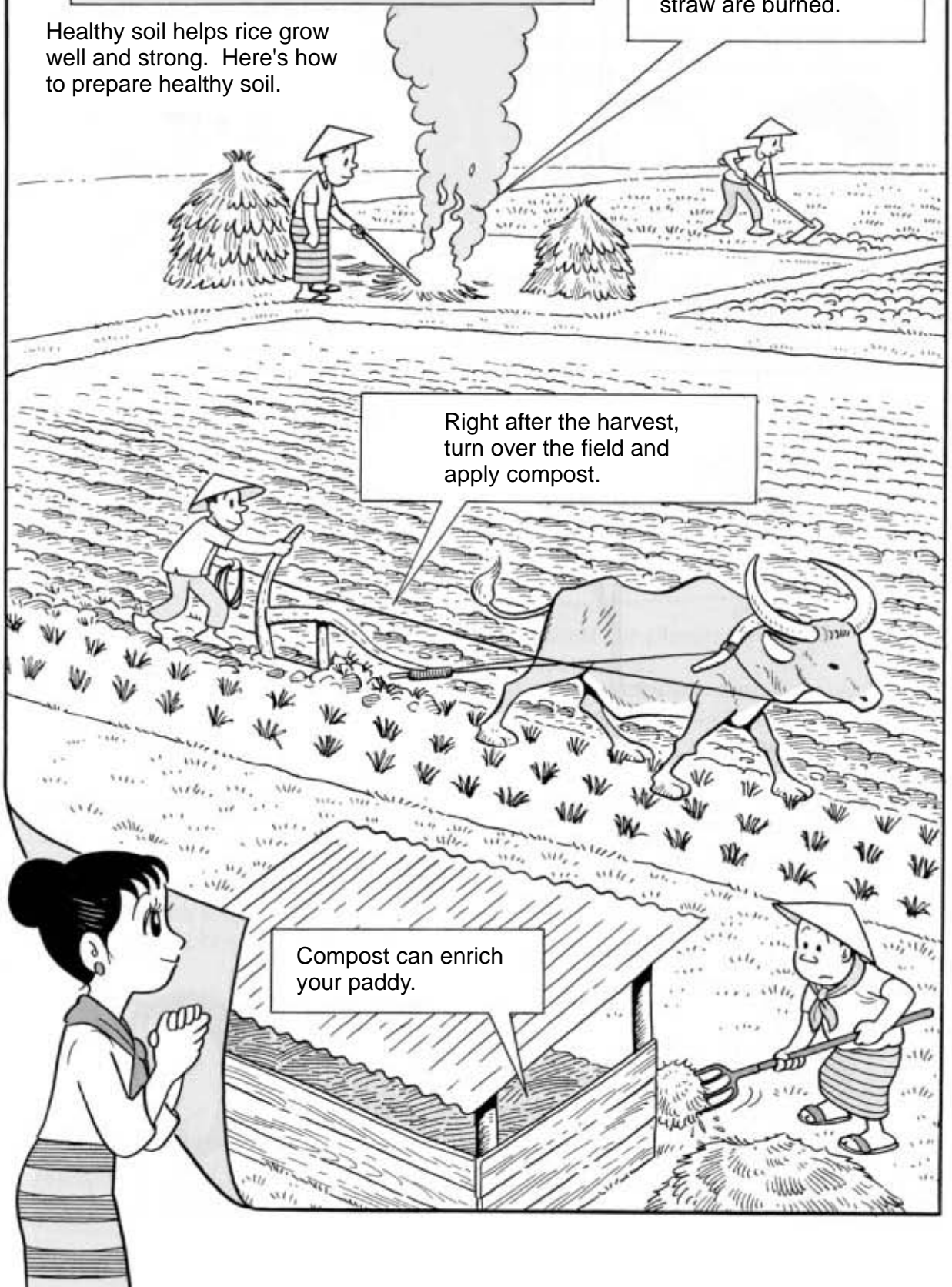




## How to Prepare Healthy Soil

Healthy soil helps rice grow well and strong. Here's how to prepare healthy soil.

Diseased stubble and straw are burned.



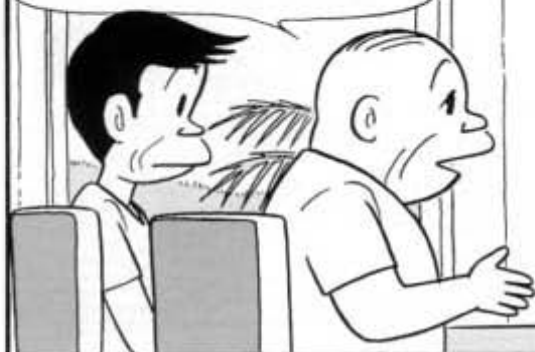
Right after the harvest, turn over the field and apply compost.

Compost can enrich your paddy.

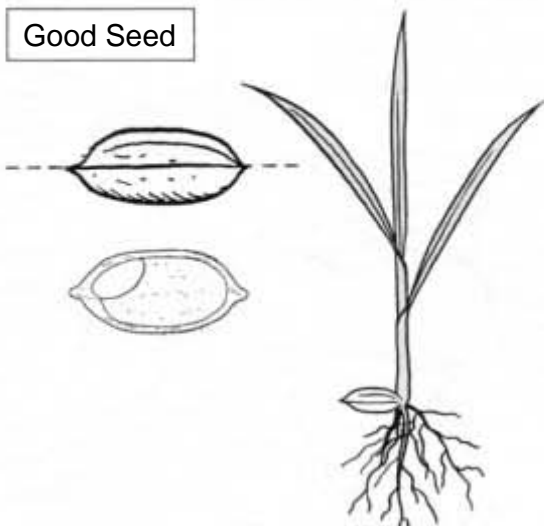
## Good Seeds & Bad Seeds

Firstly, healthy soil . . . then the seeds, I suppose!

Right! If you plant bad seeds, the rice won't grow well - or worse, it can spread disease to other plants.

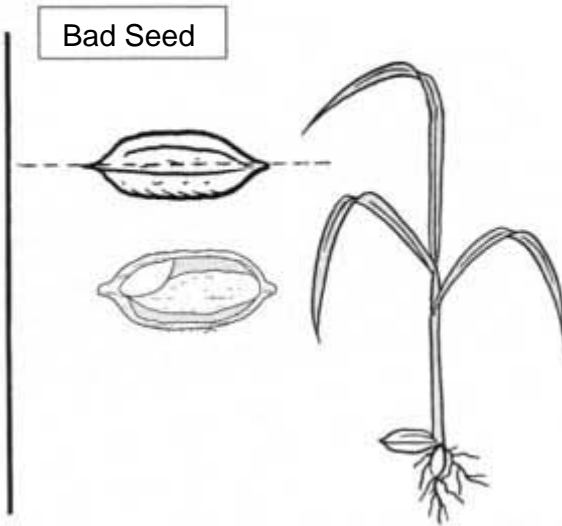


Good Seed



Seedlings from Good Seed

Bad Seed



Seedlings from Bad Seed

Planting good seeds brings better harvest. And there are simple ways to select good seeds like these.



Let's see what are good seeds!

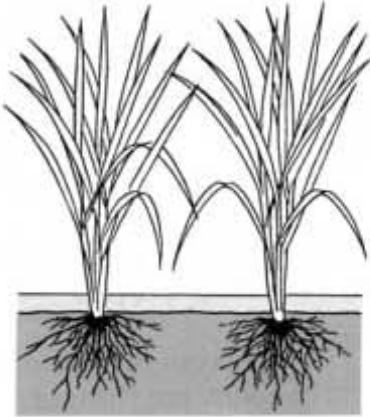




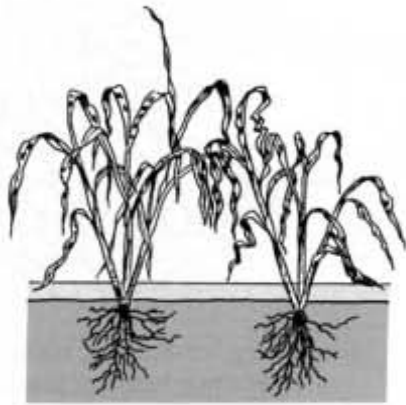
## Choose Good Variety Strong against Disease

There are many varieties of rice and some are resistant against specific diseases. So, if the rice crop gets a disease easily, it is better to change the variety next season.

Plants from two different varieties grown under the same condition



plants from resistant variety



plants from another variety

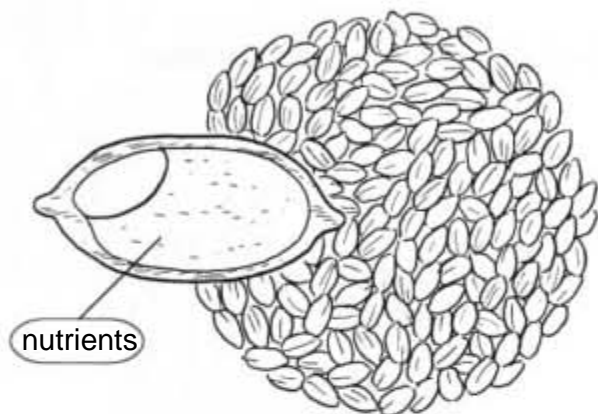
Find out which kind of seed is the best for your field.

Always use good seeds as planting material.  
If you do not use good seed,  
even a resistant or strong variety cannot do well.

You may ask an  
agricultural extension  
worker what varieties  
resistant to the disease  
are available.

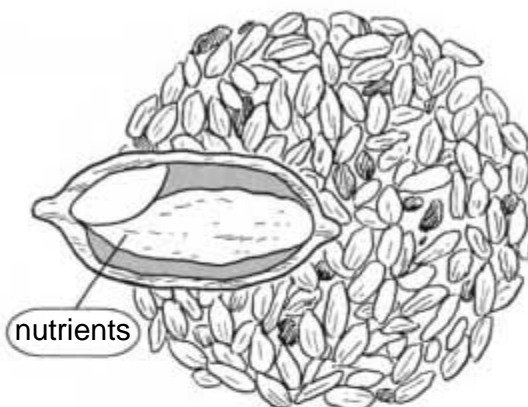
## Selecting Good Seeds

### Good Seeds



Heavy, containing more nutrients to produce healthy seedlings.

### Bad Seeds



Empty or half-filled, or their colour has changed.

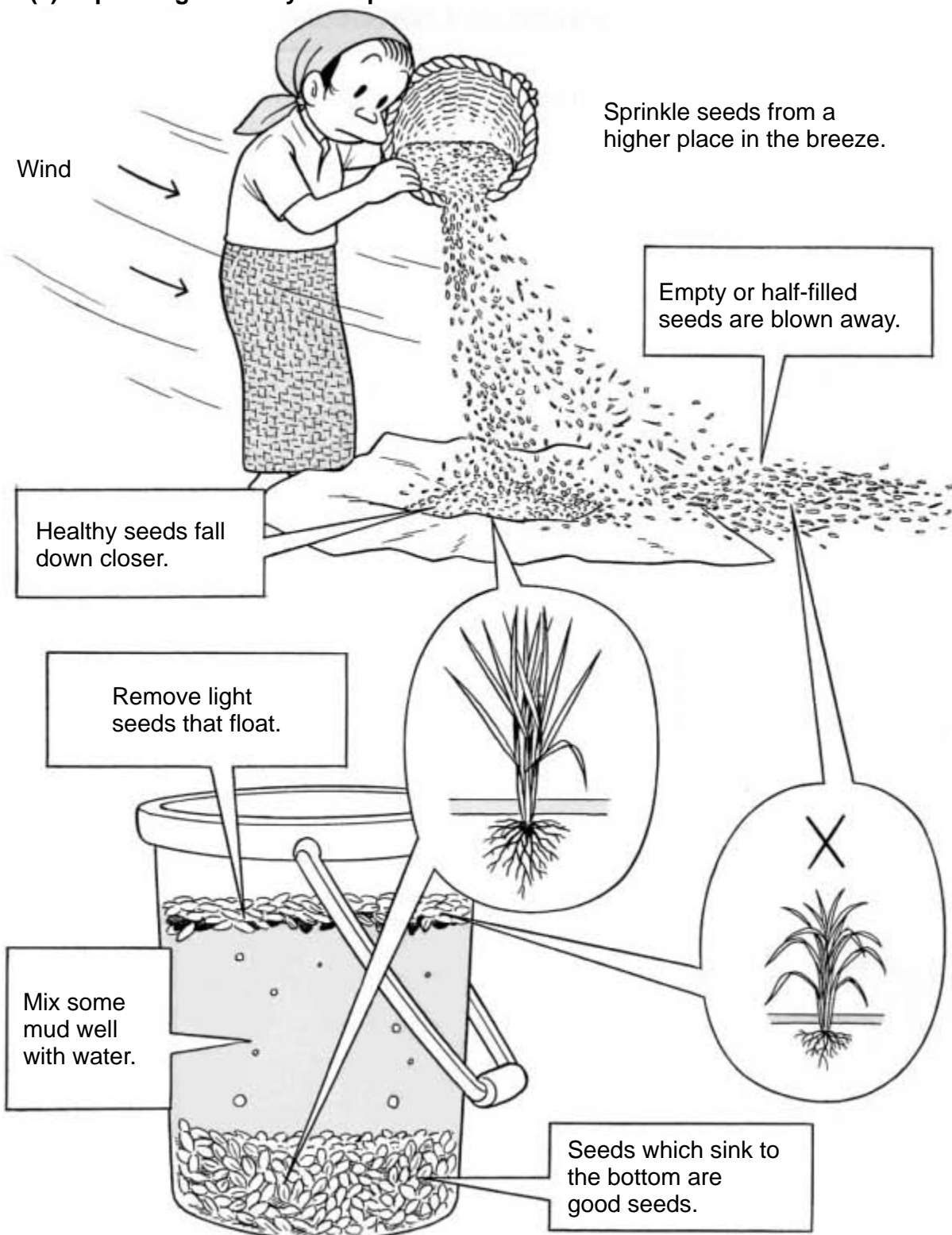
Let's use good seeds which will yield a better harvest. And before storing seeds, make sure that weed seeds, crop residues, soil particles and insect pests are removed.



(1) Separating good and bad seeds



## (2) Separating seeds by wind power



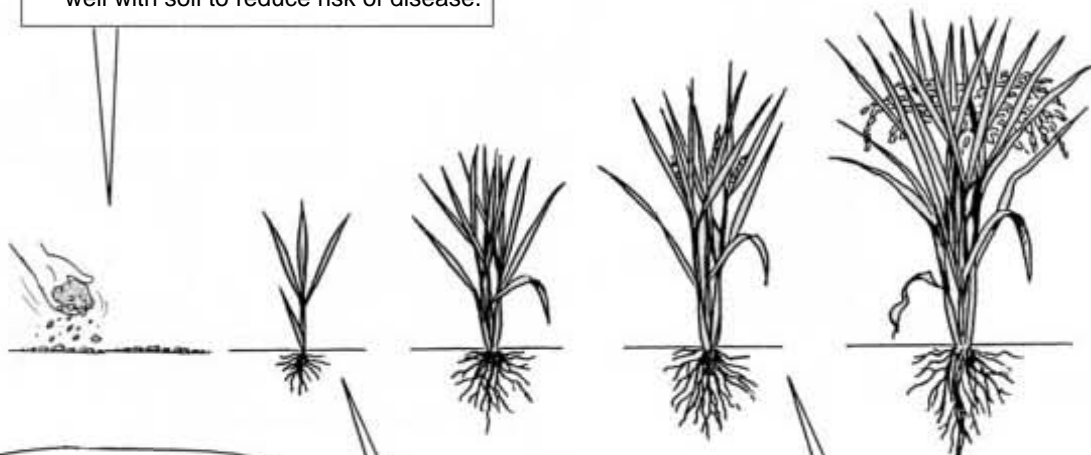
## (3) Separating in mud water

## Using Fertilizer Effectively

### Three best times for fertilizer

\*Be careful not to apply fertilizer before rain.

(1) Mix compost or organic fertilizer well with soil to reduce risk of disease.



Lack of fertilizer and too much fertilizer can cause damage to your plants. If you apply too much nitrogen, it can cause spots on leaves and plants may become lodging, too.

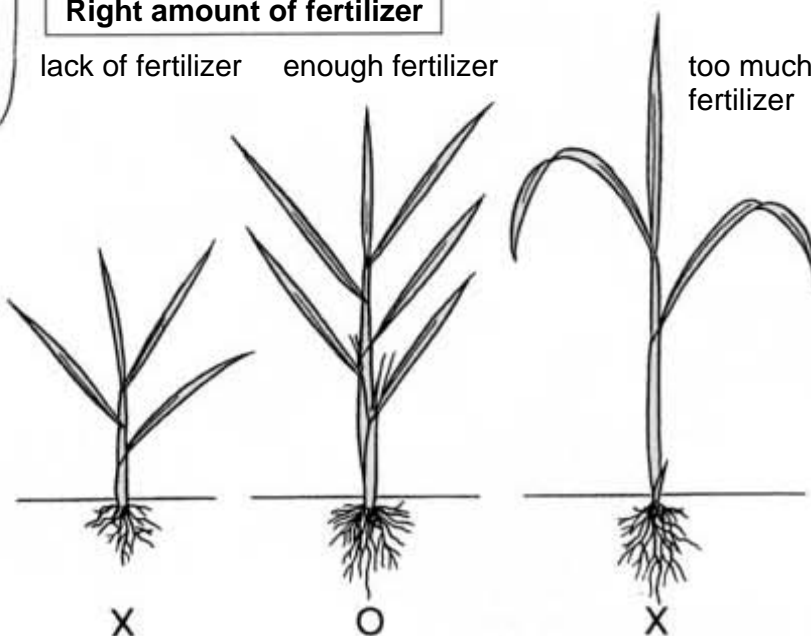
(2) Apply fertilizer during tillering.

(3) Apply fertilizer before flowering.

### Right amount of fertilizer

lack of fertilizer      enough fertilizer

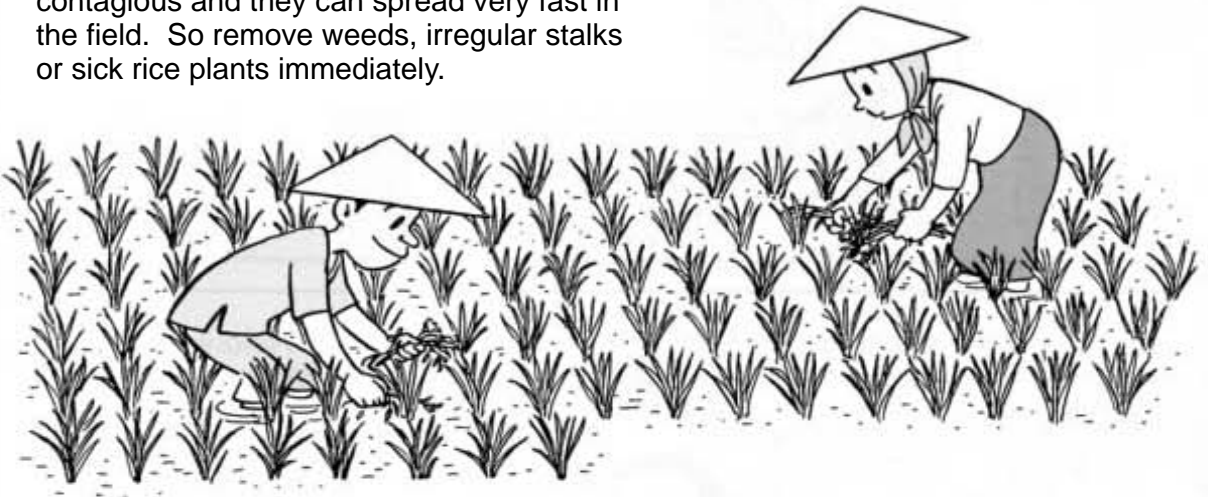
too much fertilizer





## Remove Weeds and Sick Rice Plants

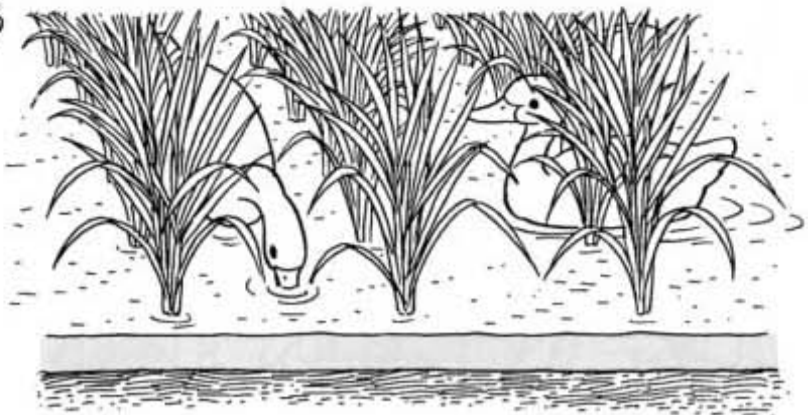
Weeds may carry disease or take away the nutrients from the soil that the rice needs to grow well. Some rice diseases are contagious and they can spread very fast in the field. So remove weeds, irregular stalks or sick rice plants immediately.



Weeding during the first few weeks after planting increases healthy growth of rice. Later, ducks can help reduce weeds.

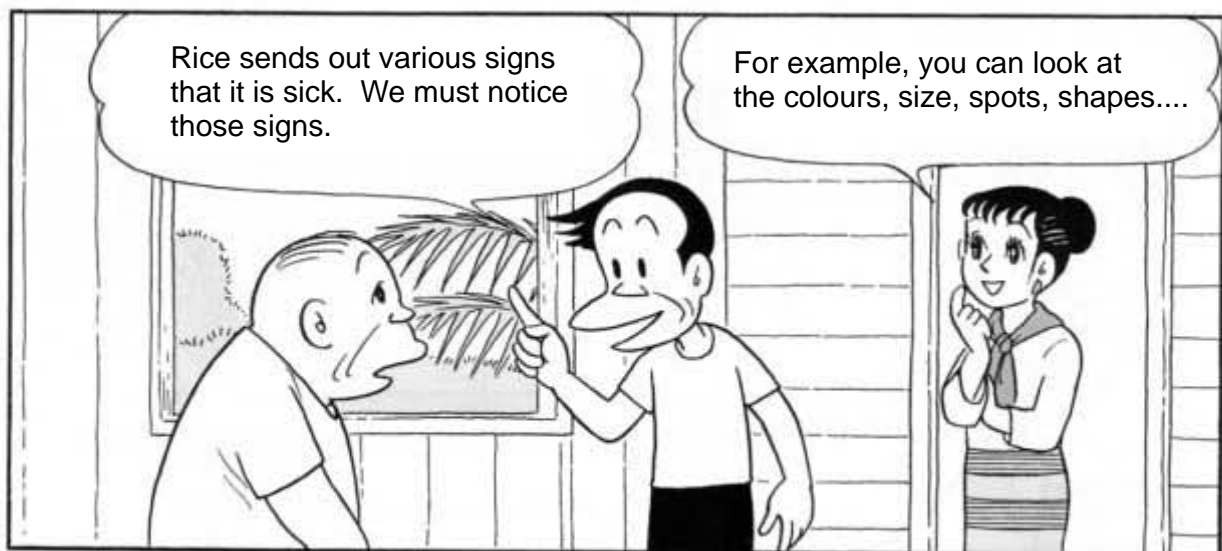
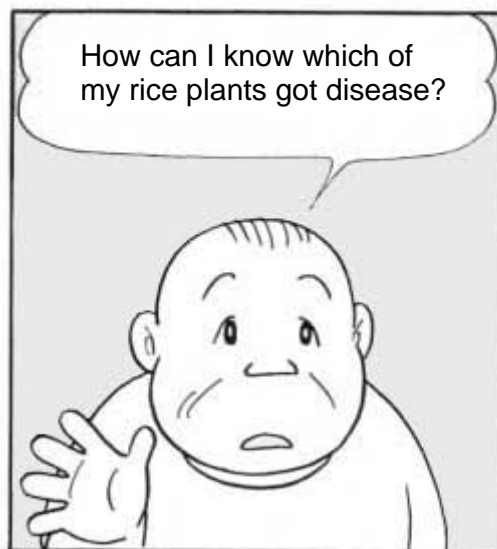
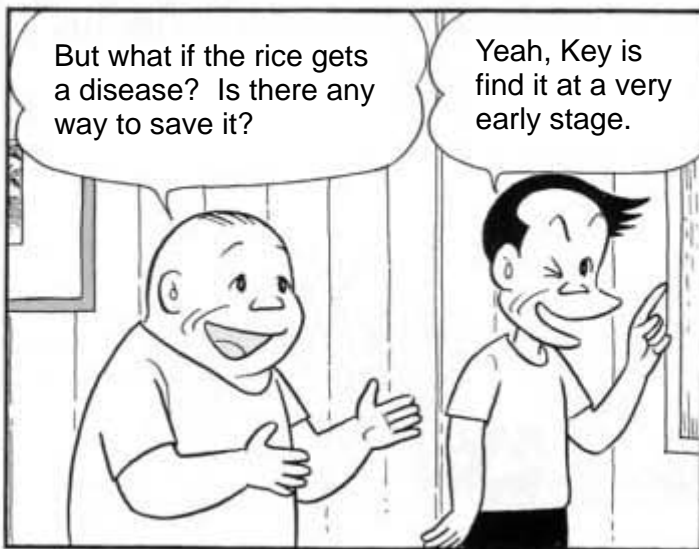
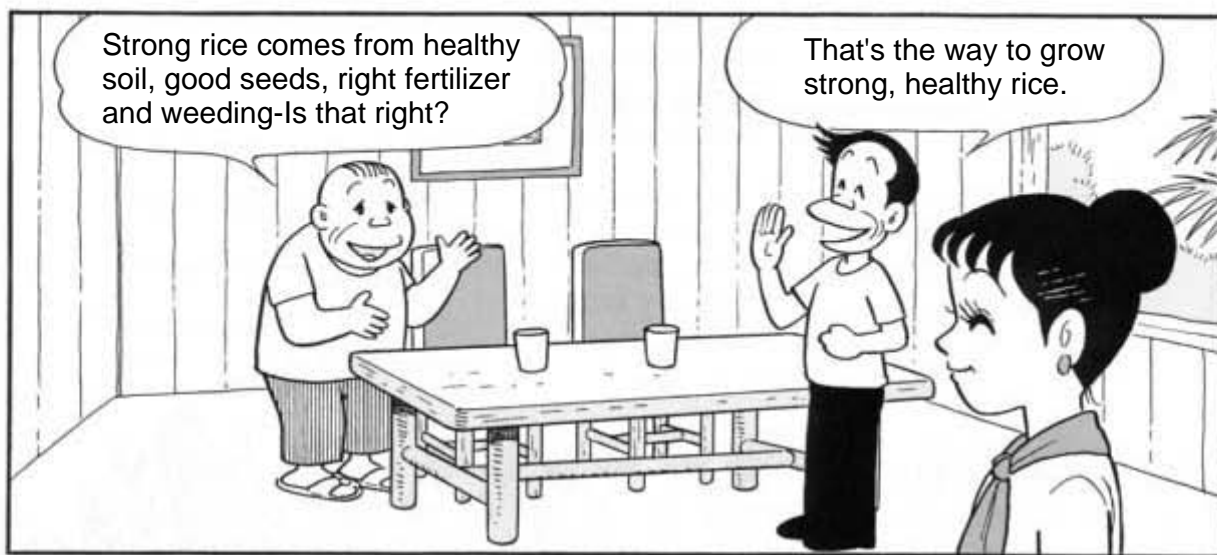


**Paddy with weeds and sick plants**



**Paddy without weeds and sick plants**







We must see if there is any plant that looks different from the others.



Is there any colour change in the leaves, are they yellowish, brownish or whitish?



Colour

Are some plants shorter or taller than others?



Size

Are there spots on the leaves?



Spots

Is there strange structure of grains?



Shape

My towel, the colour has faded, it's got holes and the shape is unusual!

Ha, ha! Just like sick rice!





# Examples of Rice Diseases



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## (1) Bacterial Blight

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This is a serious rice disease during the rainy season. Tops or edges of the leaves change color from green to white and edges become wavy.

### **Damage**

- Leaf and plant dying
- Empty grains

### **Preventive Action**

- Burning of diseased stubble
- Good land preparation
- Planting resistant variety
- Selecting good seed

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## (2) Sheath Blight

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This is often seen in crowded rice fields where nitrogen fertilizer is applied excessively.

### **Damage**

- Spots on leaf blade and sheath
- Dying leaves
- Empty grains

### **Preventive Action**

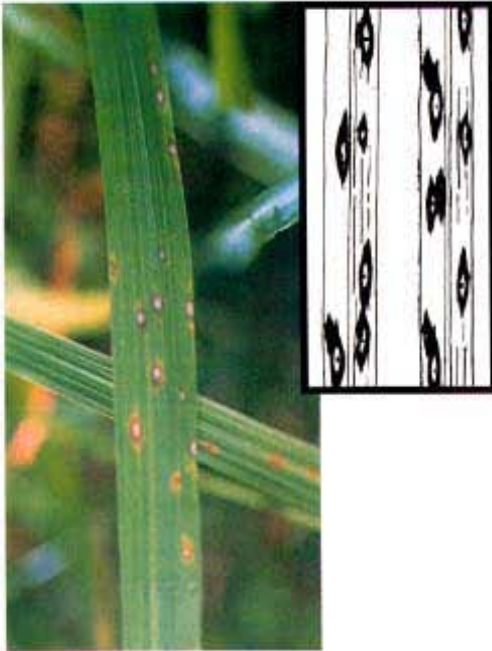
- Burning of diseased stubble
- Good land preparation
- Chemical control with right chemical at proper dose and proper time



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### (3) Blast

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This is a leaf spot disease often caused by large amount of nitrogen, cloudy skies, and rain. Almond-shaped (wide in the center and pointed towards the ends) and dark brown spots can be found on leaf and leaf sheath, neck of panicles.

#### **Damage**

- In severe cases, rice plants in field may all die
- Panicle breaks at the neck.

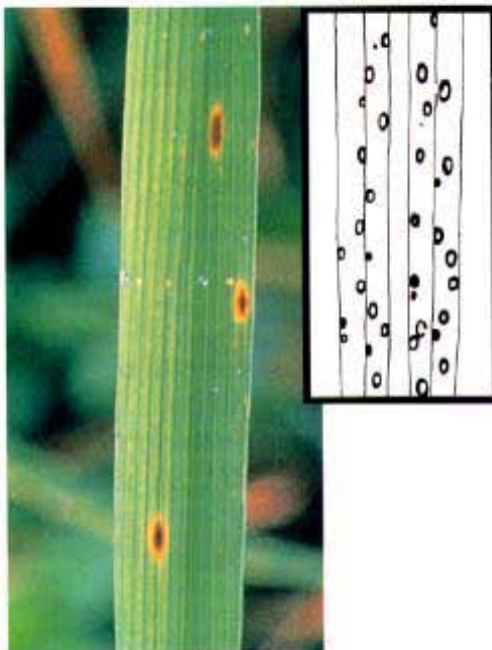
#### **Preventive Action**

- Planting resistant variety
- Good fertilizer management
- Chemicals -right chemical at proper dose and proper time.

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### (4) Brown Spot

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This is another leaf spot disease frequently occurring due to poor soil condition. Spots are brown and circular. Size of spots varies from that of pin-head to rice grain.

#### **Damage**

- Leaf dying

#### **Preventive Action**

- Good land preparation
- Planting resistant variety
- Good seed
- Fertilizer at proper dose and proper time.

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## (5) Tungro

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Rice plants change colour from green to yellow to orange. Green leaf hoppers spread this disease.

### **Damage**

- Whole plant affected
- No panicle produced

### **Management**

- Planting resistant varieties.
- Removal of tungro virus infested plants from the field

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## (6) Grain Discoloration

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Grain itself can get disease. When this happens, colour of panicles are brown to dark brown. Affected grains easily break.

### **Damage**

- Grains empty or half empty

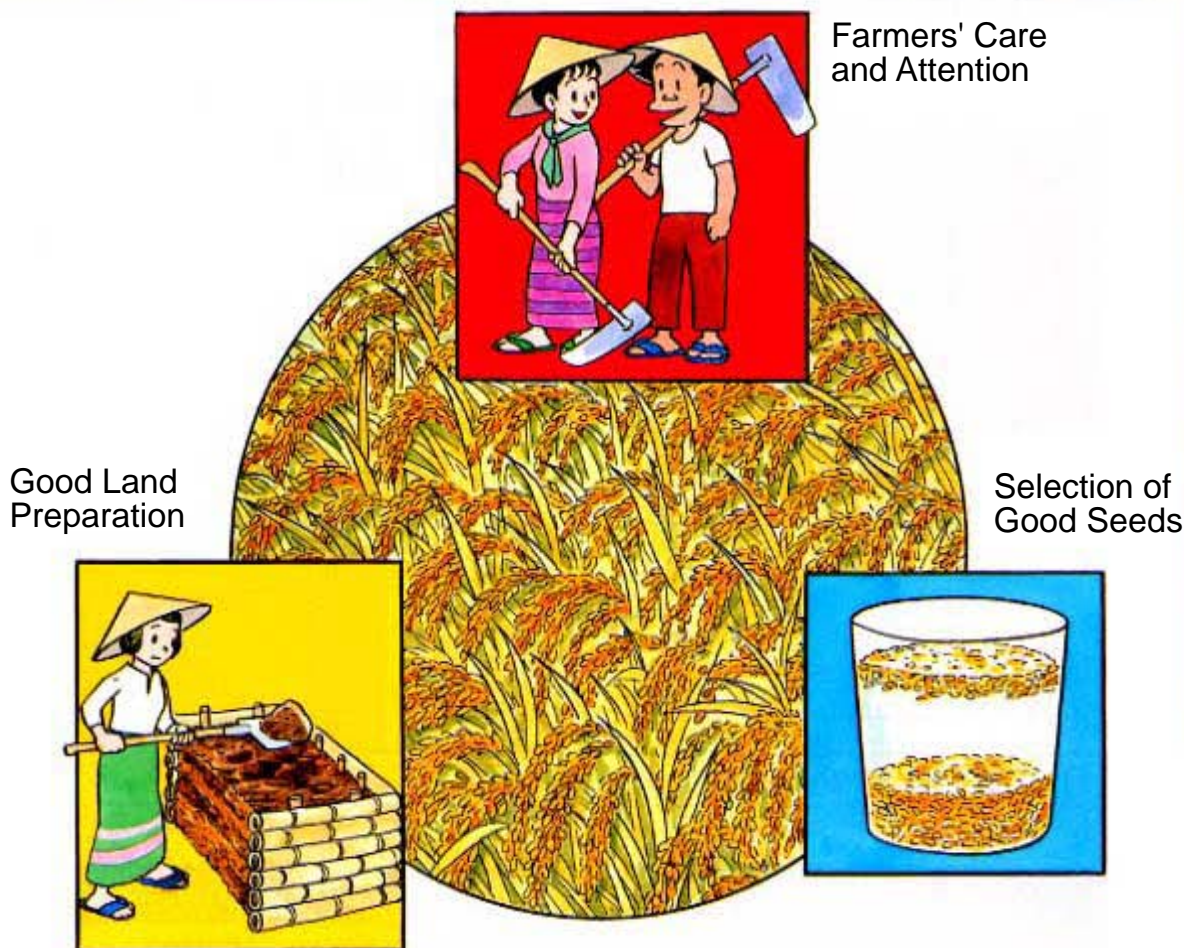
### **Preventive Action**

- Good seed
- Chemical seed treatment with appropriate chemical

You can see the differences  
Top part is grain discoloration.



# Three Reminders for a Good Harvest



## Guide for Utilization

**Target audience:** neo-literates at self-learning level engaged in rice cultivation

### Objectives:

To enable learners to

- (1) understand what makes a healthy rice paddy,
- (2) grow healthy rice that is resistant against diseases,
- (3) know simple ways to identify diseases.

And to motivate learners' interest in more reading materials on agriculture and other subjects.

### Application:

1. Before distributing this booklet, learners share their experiences concerning problems of small harvest and rice diseases etc. through discussion.
2. After distributing the booklet, instructor should ask learners to read it and discuss with them the possibility of diseases control and whether they think the simple measures introduced in the booklet are useful and applicable.
3. Instructor may give some further explanation on pages 17-19 on the information on major rice diseases for better comprehension.
4. Instructor can show, if possible, reading materials on different topics concerning agriculture to the learners for further reading.

Illustrated by Shinichi Suzuki (Japan)

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